

Course code	LSP356
Course name	NR-10 - Refresh - Safety for Electrical Installations and Services
Duration	2 days
Target group	Industrial and maritime workers who deal directly or indirectly with electricity.
Prerequisites	<ul> <li>ID and CPF;</li> <li>Passport (expatriate);</li> <li>Elementary School Certificate;</li> <li>Occupational Health Certificate (ASO) or Certificate of good physical and mental health;</li> <li>Initial certificate of the NR-10 Basic training (Safety in Electrical Installations and Services), with a minimum duration of 40 hours.</li> </ul>
Objective	To refresh the knowledge of industrial and maritime workers who deal directly or indirectly with electricity
Contents	Theory - 16 Hours  1. Introduction to Safety with Electricity: a) electricity basics; b) history and evolution of electricity; c) standards and regulations; d) hazards and regulations; d) hazards and resk associated with electricity; e) safety measures; f) right of refusal and responsibilities; g) accident cases and lessons learned; h) safety culture.  2. Risks in Installations and Services with Electricity: a) electric shock, mechanisms and effects; b) electrical arc, burns and falls; c) electromagnetic fields.  3. Risk Analysis Techniques: a) introduction to risk analysis techniques; b) risk identification; c) risk classification; d) human error analysis; e) failure mode and effect analysis (FMEA); f) preliminary risk analysis (PRA); g) risk assessment; h) risk management; i) case study; j) complementary analysis techniques.  4. Electrical Risk Control Measures: a) de-energization; b) functional grounding (TN/TT/IT); protection; temporary; c) equipotential bonding; d) automatic power disconnection; e) residual current devices (RCDS); f) extra low voltage; g) barriers and enclosures; h) lockouts and tagouts; i) obstacles and barriers; j) insulation of live parts; k) double or reinforced insulation;

- I) out of reach placement;
- m) electrical separation.
- 5. Brazilian Technical Standards NBR of ABNT: NBR 5410, NBR 14039 and others:
- a) introduction to brazilian technical standards;
- b) NBR 5410: Low Voltage Electrical Installations;
- c) NBR 14039: Medium Voltage Electrical Installations;
- d) other relevant standards;
- e) practical applications and case studies.
- 6. regulations of the ministry of labor and employment (MTE):
- a) NR'S;
- b) NR 10 Safety in Electrical Installations and Services;
- c) qualification; legal qualification; training and authorization.
- 7. Collective Protective Equipment:
- a) definition and importance of CPEs;
- b) common types of CPES;
- c) standards and regulations;
- d) selection and use criteria;
- e) maintenance and inspection of CPEs;
- f) limitations of CPEs.
- 8. Personal Protective Equipment:
- a) definition and importance of PPE;
- b) types of PPE;
- c) certificate of approval (CA);
- d) responsibilities of the parties involved;
- e) training and mentoring;
- f) maintenance and replacement;
- g) adaptations for people with disabilities (PWD);
- h) PPE used in electricity.
- 9. Work Routines Procedures:
- a) de-energized facilities;
- b) clearance for services;
- c) signage;
- d) inspections of areas, services, tooling and equipment;
- e) teamwork procedures;
- f) control and protection measures;
- g) documentation and authorization;
- h) training and qualification.
- 10. Documentation of electrical installations:
- a) electrical installations record (PIE);
- b) update and maintenance;
- c) contents of the record;
- d) access and availability;
- e) certifications and compliance;
- f) emergency procedures;
- g) review and validation;
- h) integration with other standards.
- 11. Additional Risks:
- a) height;
- b) confined environments;
- c) classified areas;
- d) humidity;
- e) weather.
- 12. Fire Protection and Firefighting.
- 13. Accidents of Electrical Origin:
- a) direct and indirect causes;
- b) case discussion.

- 14. First Aid:
- a) understanding injuries;
- b) prioritizing emergency response;c) application of artificial respiration;
- d) cardiac massage;
- e) techniques for casualty removal and transport;
- f) practices.
- 15. Responsibilities.

Technical Reference: NR 10; NBR 5410; NBR 14039.

Exam

Multiple-choice test with a minimum passing score of 60%.

Validity: 2 years